

OPERATING SUMMARY

**FORT ERIE**

**water pollution  
control plant**

1968

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F66  
W38  
1968  
MOE

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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

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*Water management in Ontario*

Ontario  
Water Resources  
Commission

135 St.Clair Ave.W.  
Toronto 7  
Ontario

We are pleased to present you with the Operating Summary for the water pollution control facilities operated for you during 1968.

Both the financial and technical information presented should be of assistance to your present and future planning in this important phase of municipal activity.

A new format has been devised to allow greater readability with equally detailed content. We trust that this will meet with your approval.

Our staff wish to express their appreciation for your co-operation throughout the year.



D. S. Caverly,  
General Manager.



D. A. McTavish, P. Eng.,  
Director,  
Division of Plant Operations.

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**FORT ERIE**

**water pollution control plant**

operated for

THE TOWN OF FORT ERIE

by the

ONTARIO WATER RESOURCES COMMISSION

**1968 ANNUAL OPERATING SUMMARY**

## **FOREWORD**

● This operating summary outlines the project's technical capabilities and financial status in 1968. Such information mirrors past and present performance, but a major intention is to anticipate the future -- to solve problems before they occur.

The new format in which this year's data are presented is designed to offer a higher level of readability than in the past, without a corresponding decrease in compactness, accuracy and detail.

Although your Regional Operations Engineer carries the major responsibility for the contents of the report, those involved in its preparation are attached to several Commission sections and divisions. The statistics section of the Division of Plant Operations compiled the information for the graphs and charts. The draughting section of the Division of Sanitary Engineering drew the graphs. The Division of Finance provided all cost data.

Only the close co-operation of these departments allowed the publication of this summary.

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# '68 REVIEW

A total of 527.08 million gallons of raw sewage was treated at the Fort Erie plant during 1968, as compared to 607.17 million gallons in 1967. The average daily flow for the year was 1.44 million gallons or 80% of the plant design dry weather flow of 1.8 million gallons per day. The dry weather design flow was exceeded 30% of the time during 1968.

The operating cost for the year was \$33,844.08 as opposed to \$27,797.55 in 1967. The operating cost per million gallons of sewage treated increased to \$64.21 from \$45.78, reflecting a decrease in raw sewage and an increase in operating costs. The organic strength of the raw sewage increased slightly in 1968 but remained well below normally accepted values.

Both the primary and secondary digesters were drained and necessary repairs were made to internal piping during the year. Maintenance at the plant and pumping station was once again of high calibre and all structures and equipment were in excellent condition at the year's end.

## **PROJECT COSTS**

|   |                     |
|---|---------------------|
| NET CAPITAL COST (Final)  | \$807,050.52        |
| DEDUCT - Payments from<br>Municipality                                | \$ 55,000.00        |
| - Portion Financed by<br>CMHC-MDLB (Final)                            | 535,794.31          |
| Long Term Debt to OWRC  | <u>590,794.31</u>   |
|   | <u>\$216,256.21</u> |
| Debt Retirement Balance at Credit<br>(Sinking Fund) December 31, 1968 | \$ 28,531.44        |
| Net Operating   | \$ 33,844.08        |
| Debt Retirement   | 4,364.00            |
| Reserve   | 4,784.63            |
| Interest Charged  | <u>12,141.36</u>    |
| TOTAL   | <u>\$ 55,134.06</u> |

### RESERVE ACCOUNT

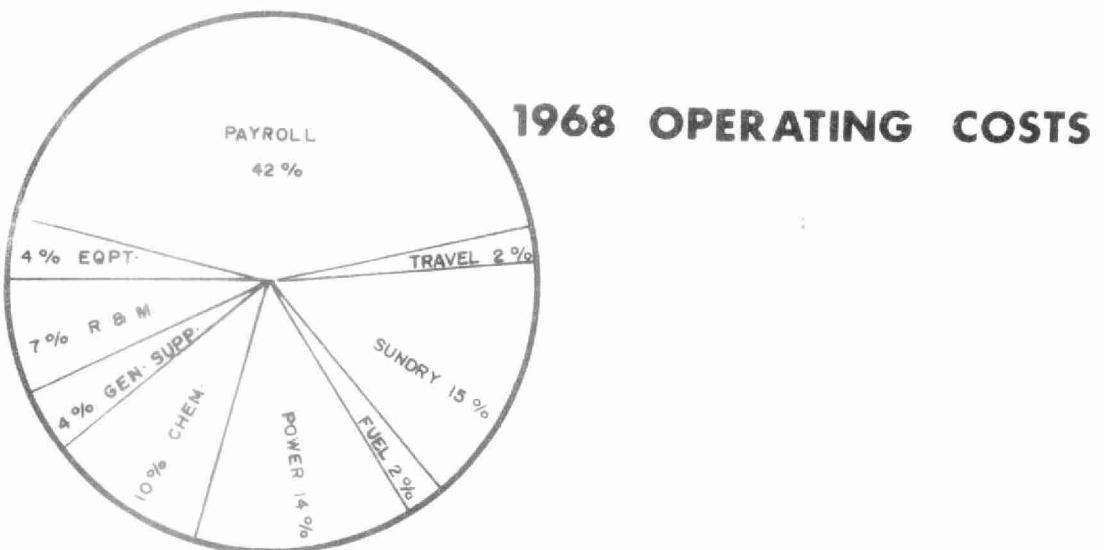
|                              |                                 |
|------------------------------|---------------------------------|
| Balance at January 1, 1968   | \$ 24,756.54                    |
| Deposited by Municipality    | 4,784.63                        |
| Interest Earned              | 1,559.31                        |
|                              | <u>                        </u> |
|                              | \$ 31,100.48                    |
| Less Expenditures            | <u>                        </u> |
|                              | 636.78                          |
| Balance at December 31, 1968 | <u>\$ 30,463.70</u>             |

## Monthly Operating Costs

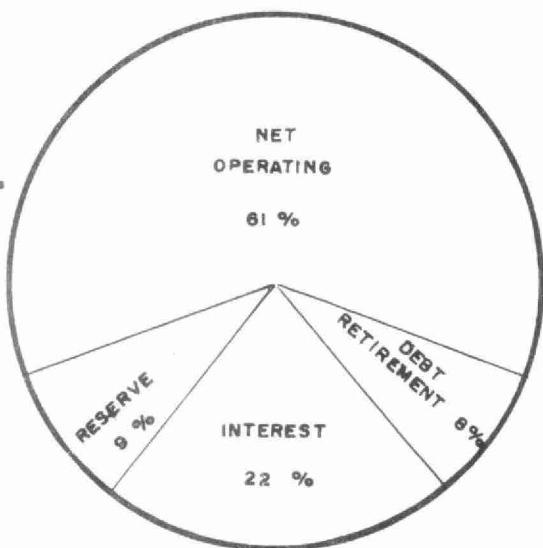
| MONTH        | TOTAL EXPENDITURE | PAYROLL         | CASUAL PAYROLL | FUEL          | POWER          | CHEMICAL       | GENERAL SUPPLIES | EQUIPMENT      | REPAIRS & MAINTENANCE | * SUNDAY       | WATER    | TRAVEL        |
|--------------|-------------------|-----------------|----------------|---------------|----------------|----------------|------------------|----------------|-----------------------|----------------|----------|---------------|
| JAN          | 1042.18           | 916.34          | -              | -             | -              | -              | 12.00            | 22.93          | 70.35                 | 20.56          | -        | -             |
| FEB          | 2918.77           | 912.09          | -              | 125.18        | 329.88         | 1109.85        | 61.14            | -              | 67.49                 | 269.25         | -        | 43.89         |
| MAR          | 3525.81           | 1455.46         | -              | 127.79        | 408.97         | 1198.05        | 102.25           | -              | 131.27                | 71.64          | -        | 30.38         |
| APRIL        | 2315.16           | 912.09          | -              | 152.58        | 374.92         | -              | 231.36           | 381.61         | 95.64                 | 126.08         | -        | 40.88         |
| MAY          | 6125.97           | 912.09          | 57.48          | 72.76         | 349.29         | -              | 138.74           | 482.61         | 209.71                | 3732.80        | -        | 169.49        |
| JUNE         | 2008.49           | 1059.92         | 147.02         | 34.98         | 363.05         | -              | 71.92            | 74.79          | 225.23                | 110.07         | -        | (78.49)       |
| JULY         | 2220.92           | 927.62          | 278.17         | 51.78         | 339.66         | -              | 151.52           | 8.35           | 223.64                | 82.20          | -        | 157.98        |
| AUG          | 2284.78           | 1376.86         | 340.79         | 42.78         | 372.34         | -              | 31.34            | -              | 53.49                 | 23.92          | -        | 43.26         |
| SEPT         | 1950.65           | 923.96          | 51.72          | .58           | 380.10         | -              | 113.15           | 71.67          | 332.46                | 25.91          | -        | 51.10         |
| OCT          | 2742.08           | 943.80          | 56.18          | 16.78         | 360.67         | 1043.27        | 94.54            | -              | 158.40                | 8.32           | -        | 60.12         |
| NOV          | 2252.61           | 904.61          | 43.30          | 18.98         | 351.65         | -              | 75.35            | 56.00          | 54.86                 | 628.06         | -        | 119.80        |
| DEC          | 4456.66           | 2112.94         | -              | 84.96         | 956.13         | -              | 281.35           | 93.33          | 856.64                | 23.92          | -        | 47.39         |
| <b>TOTAL</b> | <b>33844.08</b>   | <b>13357.78</b> | <b>974.66</b>  | <b>729.15</b> | <b>4586.66</b> | <b>3351.17</b> | <b>1365.66</b>   | <b>1191.29</b> | <b>2479.18</b>        | <b>5122.73</b> | <b>-</b> | <b>685.80</b> |

\* SUNDAY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$746.08

BRACKETS INDICATE CREDIT



### TOTAL ANNUAL COST



### Yearly Operating Costs

| YEAR | M.G.TREATED | TOTAL COST  | COST PER MILLION GALLONS | COST PER LB OF BOD REMOVED |
|------|-------------|-------------|--------------------------|----------------------------|
| 1964 | 512.92      | \$23,886.73 | \$46.57                  | 18 cents                   |
| 1965 | 535.46      | 24,836.97   | 46.38                    | 12 cents                   |
| 1966 | 603.50      | 26,123.29   | 43.29                    | 19 cents                   |
| 1967 | 620.69      | 27,797.55   | 44.78                    | 15 cents                   |
| 1968 | 527.08      | 33,844.08   | 64.21                    | 16 cents                   |

## **Process Data**

### FLOWS

The total raw sewage flow received at the plant in 1968 was 527.08 million gallons, representing a decrease of 13.2% compared to the total flow of 607.17 million gallons in 1967.

The maximum total flow for one month of 68 million gallons occurred in November. The highest daily recorded flow of 4.89 million gallons as well as the lowest recorded daily flow of 0.36 million gallons occurred in June.

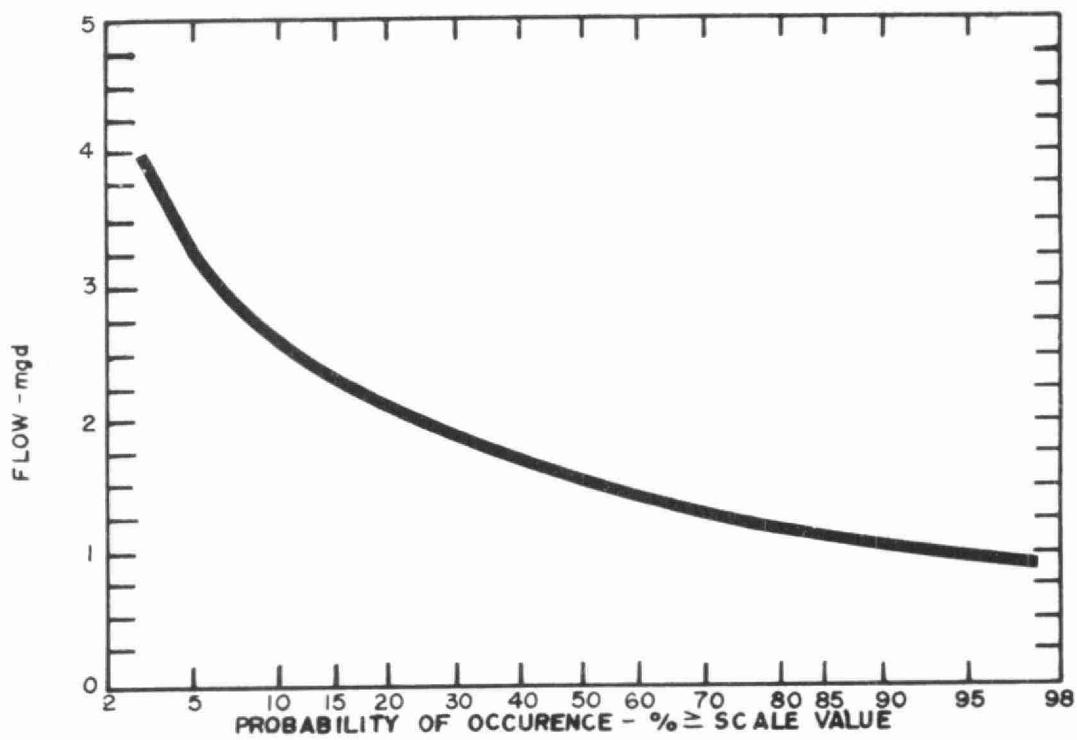
The dry weather design flow of 1.8 million gallons per day was exceeded 30% of the time, as compared to 41% of the time in 1967.

## PLANT FLOWS and CHLORINATION

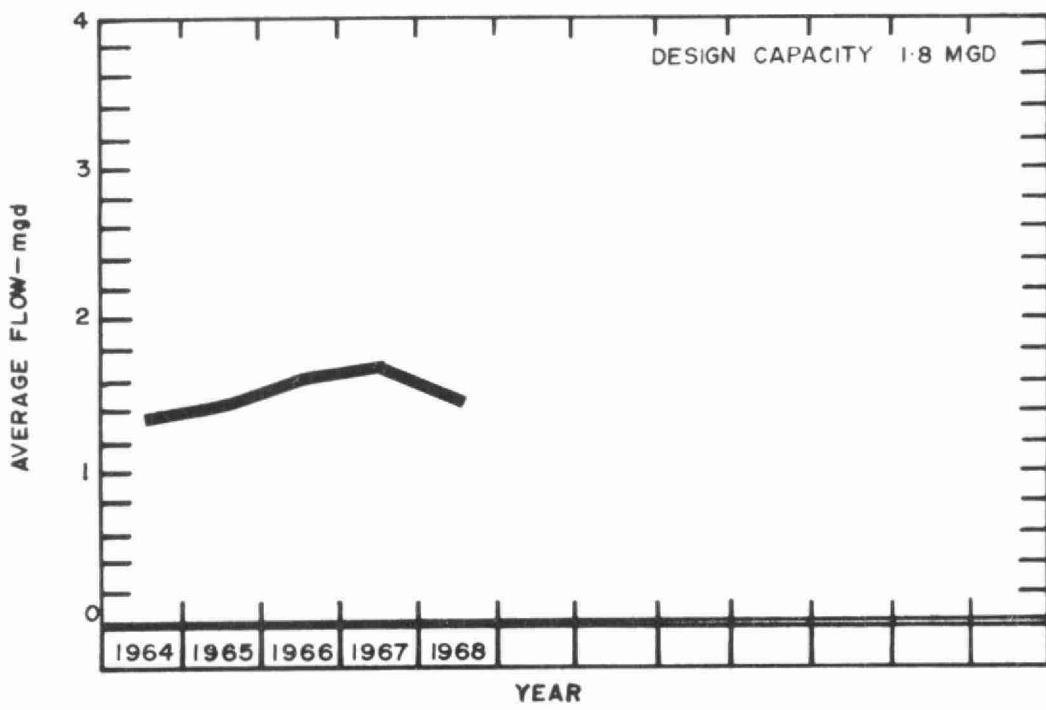
| MONTH   | TOTAL FLOW<br>mg | AVERAGE<br>DAILY FLOW<br>mg | MAXIMUM<br>DAILY FLOW<br>mg | MINIMUM<br>DAILY FLOW<br>mg | CHLORINE USED<br>lbs. | DOSAGE<br>mg/l |
|---------|------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------|----------------|
| JAN     | 35.34            | 1.14                        | 1.84                        | .37                         | 498                   | 2.2            |
| FEB     | 40.07            | 1.38                        | 4.83                        | .93                         | 519                   | 1.3            |
| MAR     | 54.99            | 1.77                        | 4.55                        | .96                         | 538                   | 1.0            |
| APR     | 37.69            | 1.26                        | 3.87                        | .64                         | 500                   | 1.3            |
| MAY     | 36.13            | 1.17                        | 2.60                        | .59                         | 1476                  | 4.1            |
| JUN     | 37.40            | 1.25                        | 4.90                        | .36                         | 2902                  | 7.8            |
| JUL     | 31.11            | 1.00                        | 1.80                        | .72                         | 2955                  | 9.5            |
| AUG     | 34.06            | 1.10                        | 2.79                        | .41                         | 2940                  | 8.6            |
| SEPT    | 43.22            | 1.44                        | 3.07                        | .85                         | 2752                  | 6.4            |
| OCT     | 50.69            | 1.64                        | 3.68                        | 1.13                        | 2660                  | 5.2            |
| NOV     | 68.00            | 2.27                        | 4.42                        | 1.12                        | 1242                  | 1.8            |
| DEC     | 58.38            | 1.88                        | 4.53                        | .93                         | 271                   | .5             |
| TOTAL   | 527.08           | -                           | -                           | -                           | 19253                 | -              |
| AVERAGE | -                | 1.44                        | -                           | -                           | 1604                  | 3.7            |

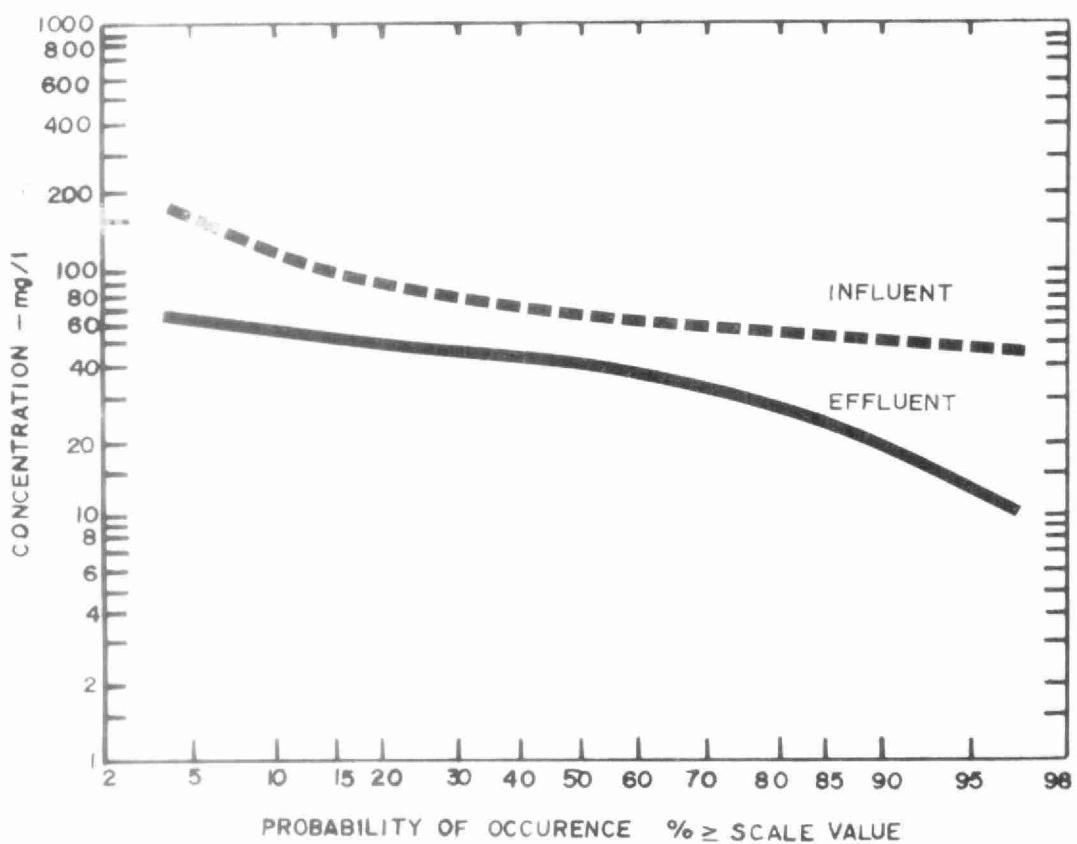
### COMMENTS

Chlorine is added to the effluent from May 14 to November 23 and 15-minute residual of 0.5 mg/l maintained. Influent chlorination is practised to eliminate odours in the detritor area of the plant.

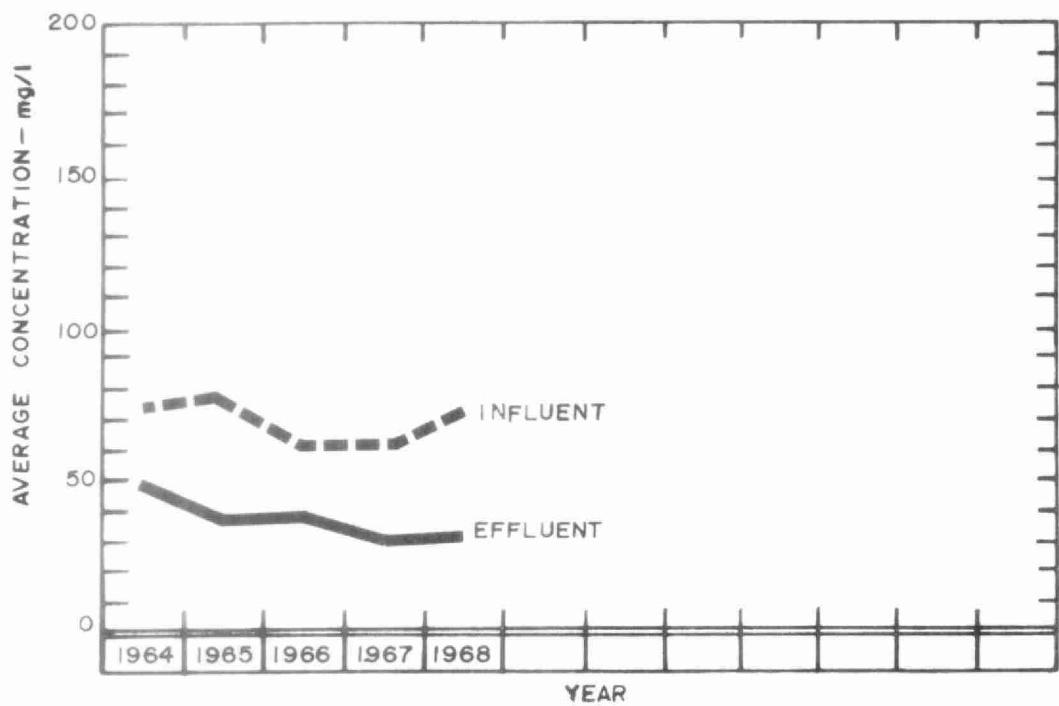


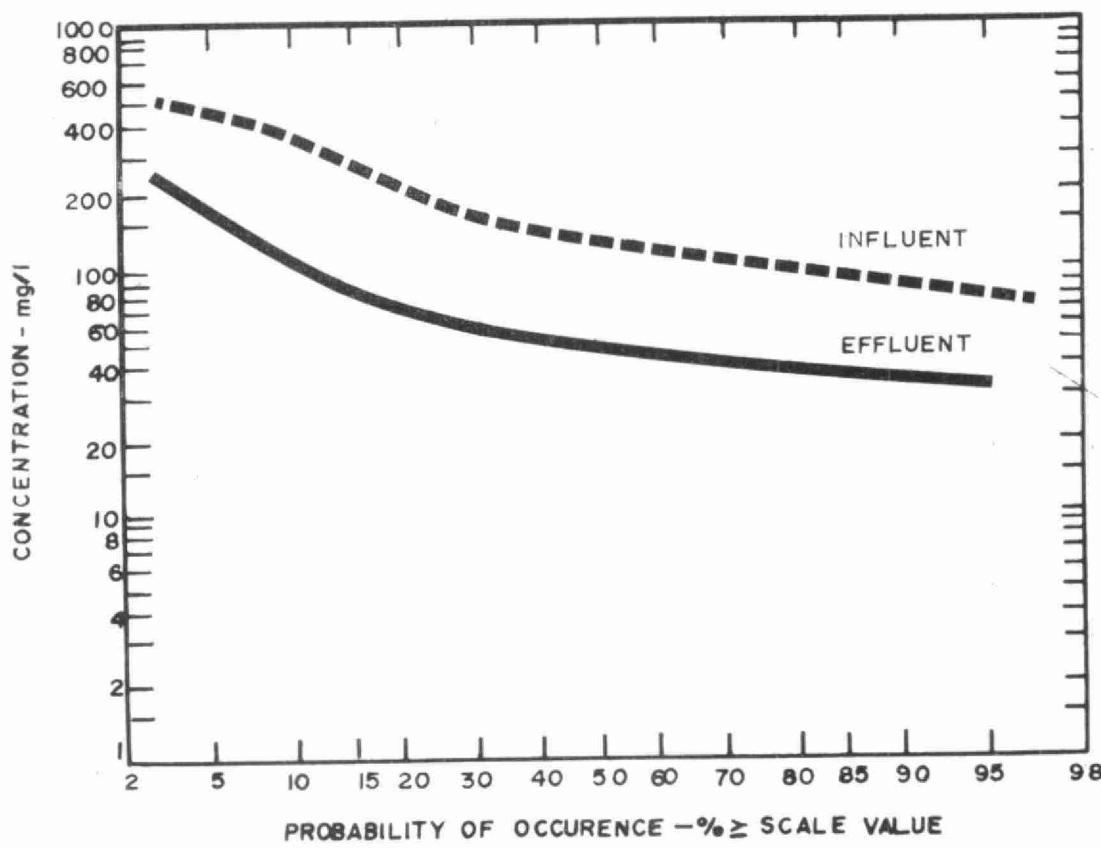
## FL O W S



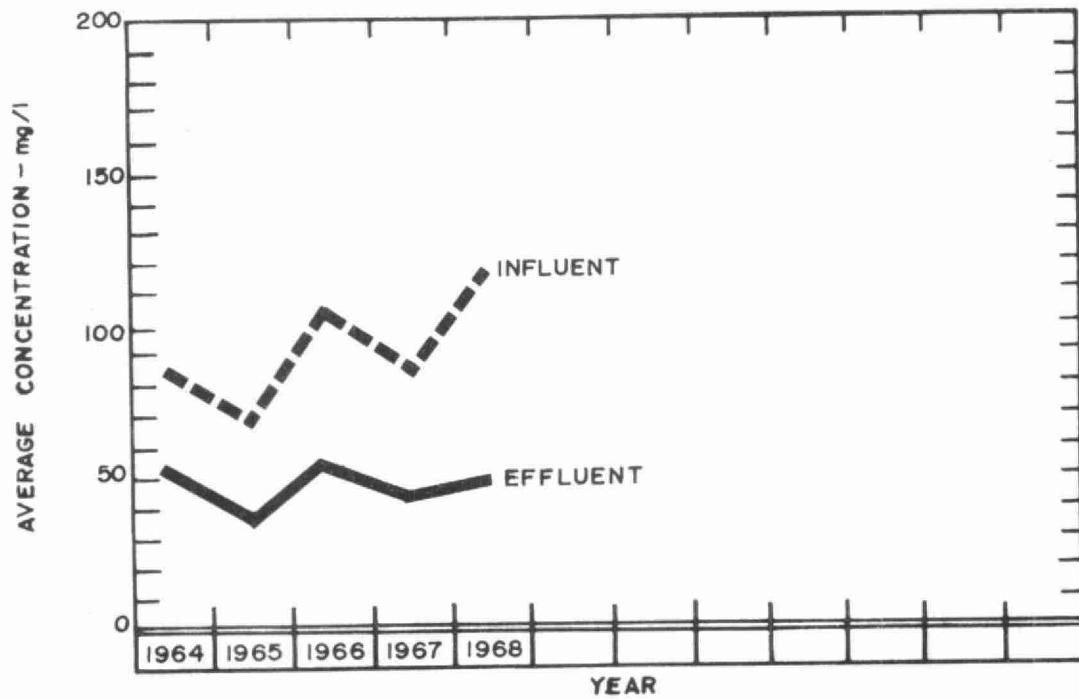


## BIOCHEMICAL OXYGEN DEMAND





## SUSPENDED SOLIDS



## PLANT EFFICIENCY

| MONTH   | BIOCHEMICAL OXYGEN DEMAND     |                               |                    |                         | SUSPENDED SOLIDS              |                               |                    |                         | GRIT<br>REMOVAL<br>ft <sup>3</sup> |
|---------|-------------------------------|-------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|--------------------|-------------------------|------------------------------------|
|         | INF CONC <sup>N</sup><br>mg/l | EFF CONC <sup>N</sup><br>mg/l | RED <sup>N</sup> % | REMOVAL<br>$10^3$<br>lb | INF CONC <sup>N</sup><br>mg/l | EFF CONC <sup>N</sup><br>mg/l | RED <sup>N</sup> % | REMOVAL<br>$10^3$<br>lb |                                    |
| JAN     | 48                            | 25                            | 48                 | 8.1                     | 83                            | 61                            | 26                 | 7.8                     | 0                                  |
| FEB     | 162                           | 51                            | 68                 | 44.5                    | 235                           | 52                            | 78                 | 73.3                    | 0                                  |
| MAR     | 59                            | 41                            | 30                 | 9.9                     | 94                            | 34                            | 64                 | 33.0                    | 4                                  |
| APR     | 50                            | 21                            | 58                 | 10.9                    | 110                           | 26                            | 76                 | 31.7                    | 3                                  |
| MAY     | 54                            | 46                            | 15                 | 2.9                     | 71                            | 54                            | 24                 | 6.1                     | 1                                  |
| JUN     | 120                           | 31                            | 74                 | 33.3                    | 104                           | 80                            | 23                 | 9.0                     | 14                                 |
| JULY    | 83                            | 39                            | 53                 | 13.7                    | 191                           | 84                            | 56                 | 33.3                    | 1                                  |
| AUG     | 64                            | 39                            | 39                 | 8.5                     | 197                           | 56                            | 72                 | 48.0                    | 41                                 |
| SEPT    | 71                            | 22                            | 69                 | 21.3                    | 62                            | 38                            | 39                 | 10.4                    | 28                                 |
| OCT     | 55                            | 38                            | 31                 | 8.6                     | 88                            | 31                            | 65                 | 28.9                    | 10                                 |
| NOV     | 57                            | 27                            | 53                 | 20.4                    | 71                            | 35                            | 51                 | 24.5                    | 12                                 |
| DEC     | 60                            | 31                            | 48                 | 17.0                    | 100                           | 34                            | 66                 | 38.5                    | 5                                  |
| TOTAL   | -                             | -                             | -                  | 199.1                   | -                             | -                             | -                  | 344.5                   | 119                                |
| AVERAGE | 74                            | 34                            | 54                 | 16.5                    | 117                           | 49                            | 58                 | 28.7                    | 10                                 |

### COMMENTS

The average strength of the raw sewage was well below design values, with 74 mg/l BOD versus 190 mg/l design and 117 mg/l SS versus 135 mg/l design. The average BOD and suspended solids values increased 19% and 38% respectively over the 1967 average values.

The removal efficiencies of 54% BOD and 58% suspended solids reflect improved performance over the 46.4% reduction in BOD and 46.8% in suspended solids in 1967.

The average grit removed during 1968 was 0.22 cubic feet per million gallons of raw sewage which is an increase of 55% over 1967 quantities.

## SLUDGE DIGESTION and DISPOSAL

| MONTH          | RAW SLUDGE              |            |           | DIGESTED SLUDGE         |            |           | SUPERNATANT             |            | SLUDGE DISPOSAL           |                              |
|----------------|-------------------------|------------|-----------|-------------------------|------------|-----------|-------------------------|------------|---------------------------|------------------------------|
|                | VOLUME<br>$10^3$<br>gal | T. S.<br>% | V.S.<br>% | VOLUME<br>$10^3$<br>gal | T. S.<br>% | V.S.<br>% | VOLUME<br>$10^3$<br>gal | T. S.<br>% | Liquid<br>yd <sup>3</sup> | Dewatered<br>yd <sup>3</sup> |
| JAN            | 38.7                    | 6.3        | 73        | 46.0                    | 14.2       | 43        | 29.4                    | .52        | 273                       | 0                            |
| FEB            | 34.0                    | 4.9        | 66        | 0                       | .6         | 61        | 21.0                    | .23        | 0                         | 0                            |
| MAR            | 37.9                    | 5.3        | 77        | 0                       | 3.9        | 55        | 29.4                    | -          | 0                         | 0                            |
| APR            | 36.3                    | 5.7        | 76        | 0                       | 10.5       | 56        | 33.6                    | .23        | 0                         | 0                            |
| MAY            | 37.9                    | 5.8        | 72        | 90.0                    | -          | -         | 0                       | -          | 723*                      | 0                            |
| JUN            | 37.5                    | 6.1        | 73        | 0                       | -          | -         | 0                       | -          | 0                         | 0                            |
| JUL            | 37.4                    | 7.6        | 69        | 0                       | -          | -         | 12.0                    | .31        | 0                         | 0                            |
| AUG            | 37.6                    | 9.1        | 61        | 0                       | -          | -         | 37.6                    | .31        | 0                         | 0                            |
| SEPT           | 36.2                    | 9.5        | 65        | 0                       | -          | -         | 36.2                    | .28        | 0                         | 0                            |
| OCT            | 37.3                    | 7.7        | 67        | 0                       | -          | -         | 37.3                    | .32        | 0                         | 0                            |
| NOV            | 36.0                    | 6.8        | 67        | 0                       | -          | -         | 36.0                    | .25        | 0                         | 0                            |
| DEC            | 37.6                    | 8.2        | 53        | 0                       | -          | -         | 37.6                    | .26        | 0                         | 0                            |
| <b>TOTAL</b>   | <b>444.4</b>            | -          | -         | <b>136.0</b>            | -          | -         | <b>310.1</b>            | -          | <b>996</b>                | <b>0</b>                     |
| <b>AVERAGE</b> | <b>37.0</b>             | <b>6.9</b> | <b>68</b> | <b>11.4</b>             | <b>7.3</b> | <b>54</b> | <b>31.0</b>             | <b>.30</b> | <b>83</b>                 | <b>0</b>                     |

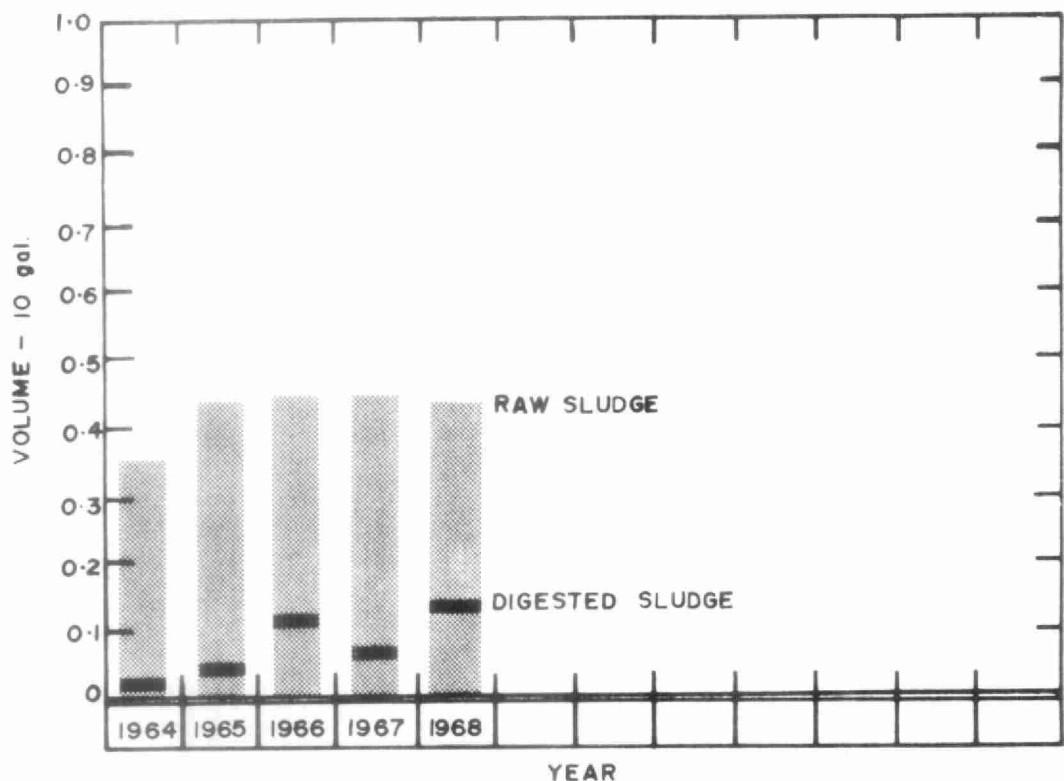
\* Digesters emptied.

### COMMENTS

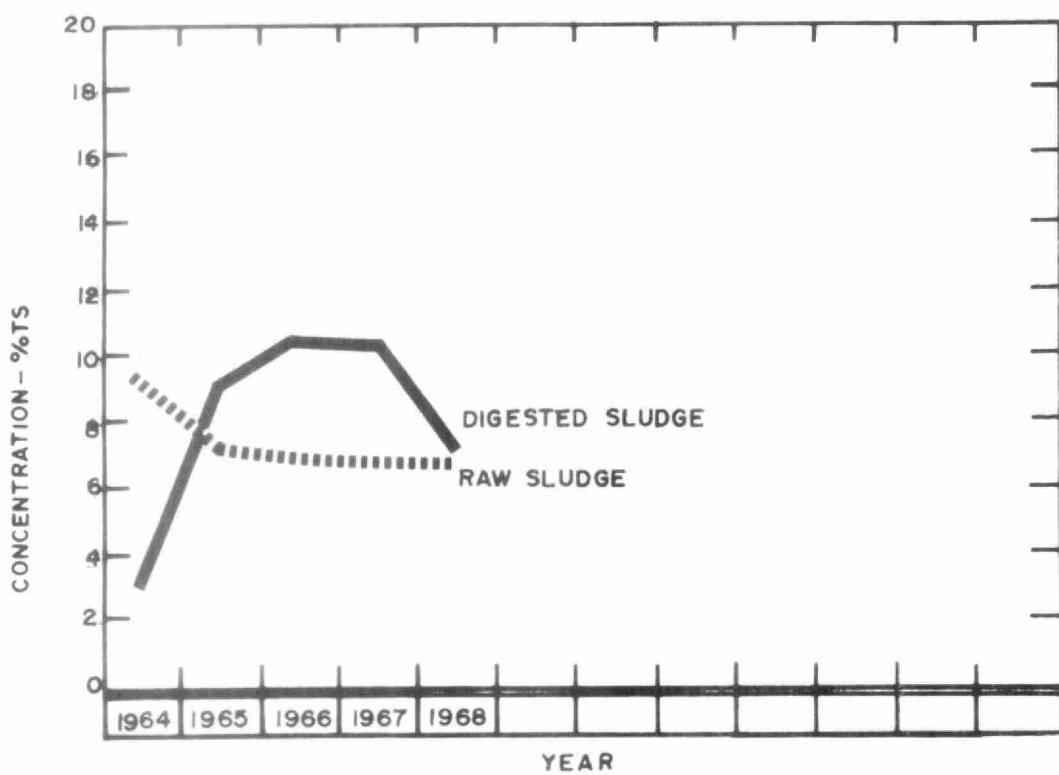
A total of 444,400 gallons of raw sludge was pumped to the digester in 1968 at an average solids content of 6.9%. This is a reduction of 1.6% as compared to the total sludge pumped in 1967.

Both the primary and secondary digesters were completely emptied during the year, and a total of 903 cubic yards of digested sludge was hauled from the plant. All accumulated grit was removed and the digester gas piping modified.

The problem of scum build-up on the surface of the primary digester remains unsolved. A number of ideas has been tried with no success, and research into this problem will continue in 1969.



## **DIGESTION**



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## CONCLUSIONS

There was some reduction in the average daily flow over the past year which would indicate a degree of success in eliminating storm water and infiltration into the municipal collection system. Plant efficiency, for the treatment provided, was satisfactory and the structures and equipment were well maintained and in good condition at the conclusion of the year.

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